SEMESTER S7

OPERATIONS RESEARCH

Course Code	**PERUT746**	**CIE Marks**	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	None	**Course Type**	Theory

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Basics of operations research- OR models- applications, Linear programming: problem formulation-Graphical method-simplex method- Big M method-Two phase method-Duality in linear programming.	**9**
2	Transportation Problem: Formulation- balanced & unbalanced transportation problems, method for finding initial solution- North west corner method- Least cost entry method-Vogel's approximation method (VAM), test for finding optimality- MODI method. Assignment Problem: Formulation-optimal solution- Hungarian Algorithm-Variants of assignment problems.	**9**
3	Introduction to queuing theory: terminologies- classification of queuing models- Kendall's notation-Single server models Multi server models. Network analysis: basic terms- network construction-time analysis-Critical Path Method (CPM)-Programme Evaluation Review Technique (PERT).	**9**
4	Decision theory: steps in decision theory approach-decision making conditions- decisions under risk-decision under uncertainty conditions-decision tree analysis. Game theory: games with saddle points- Dominance property- games without saddle points for 2x2 games- graphical method for m x 2 & 2 x n games.	**9**

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Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

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Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Formulate and solve linear programming problems.	**K2**
CO2	Optimize transportation and assignment problems using different optimization methods.	**K2**
CO3	Evaluate different parameters of queuing models.	**K2**
CO4	Construct and evaluate the project duration of a network.	**K2**
CO5	Solve a game and find an optimum decision based on different approach.	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	1			1	2		2
CO2	3	3	3	3	2	1			1	2		2
CO3	3	3	3	3	2	1			1	2		2
CO4	3	2	3	2	1	1			1	2		2
CO5	3	3	3	3	2	1			1	2		2

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Industrial Engineering and Operations Research	Miller, D.M. and Schmidt, J.W.	John Wiley & Sons, Singapore.	1990
2	Operations Research	Paneerselvam,R.	Prentice Hall of India, New Delhi.	2008
3	"Operations Research – Principles and Applications".	Srinivasan, G.	PHI Pvt.Ltd.	2010
4	Operations Research	Taha, H.A.	Pearson	2004

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Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Linear Programming	George Bernard Dantzig, Mukund Narain Thapa.	Springer series in operations research, 3rd Edition	2003
2	"Optimization Theory and Applications"".	S.S.Rao	Second Edition, New Age International (P) Limited Publishers.	1995

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